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TECHNICAL NOTE

Bureau of Land Management U.S. DEPARTMENT OF THE INTERIOR

HABITAT MANAGEMENT SERIES FOR ENDANGERED SPECIES

by Carol Snow, Research Biologist
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Report No. 4

Spotted Bat
Euderma maculatum



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FORWARD

This Technical Note series on wildlife is designed to provide a literature review and summary of current knowledge pertaining to endangered and other wildlife species occurring on public lands. We in the Bureau of Land Management have recognized the need for basic wildlife information in order to do an effective job in land-use planning. Sound planning must identify the negative aspects as well as the positive benefits of any proposed land management decision or program. It is our hope, too, that this series will also prove useful to others--be they land managers, students, researchers or interested citizens.

Burt Lilcock

Director
Bureau of Land Management
Department of the Interior

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THE first of these is the question of the

relative importance of the various

factors which enter into the

composition of the soil.

The second is the question of the

effect of the various

factors on the growth of the

plants which grow on the

soil.

The third is the question of the

effect of the various

factors on the yield of the

crops.

The fourth is the question of the

effect of the various

factors on the quality of the

crops.

The fifth is the question of the

effect of the various

factors on the health of the

animals which graze on the

soil.

The sixth is the question of the

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Introduction

The objective of this report is to provide BLM personnel with the latest and most up-to-date information on rare or endangered species occurring on the public domain. This will provide a tool for improved understanding of the interrelationships between the species and its environment and encourage an end product of enlightened land management which will fully consider the species' welfare in all management decisions.

1. Species Description

The spotted bat is also known colloquially as the pinto bat. It is one of the vespertilionid bats of the plecotine subgroup, which have exceptionally large ears. Members of this group of bats are also called mule-eared bats, jackrabbit bats, big-eared bats or long-eared bats. The spotted bat is the only species in the genus Euderma.

The spotted bat is a medium-sized bat, with the forearm measuring up to two inches long. The wing span is between thirteen and fourteen inches, and total length is as much as five inches.

The adults have blackish upper parts with three large, roughly circular white spots, one on each shoulder and one at the base of the tail. There is a patch of cottony white hair at the posterior base of each auricle. All hairs are black at the base. The hairs are white-tipped on the underparts, with the white tips incompletely concealing the black bases. The ears are larger than those of any other North American bat, and are intense pink on living bats.

The spotted bat has a bare throat patch, circular in shape, less than one third of an inch across, nonglandular and devoid of hair. It is usually concealed by the fur, but is exposed when the head is brought upward and backward (Handley, 1959; Jones, 1961; Easterla, 1970, 1971; Barbour and Davis, 1969a; Grinnell, 1910; Allen, 1891; IUCN, 1969; USDI, 1968; Easterla et al, 1969).

2. Distribution, Present and Former

The spotted bat has been reported from California, New Mexico, Arizona, Nevada, Utah, Wyoming, Montana, Idaho, Colorado, Texas, and Durango, Mexico (Easterla, 1965, 1970; Easterla et al, 1969; Durrant, 1935; Benson, 1954; Findley and Jones, 1965; Hall, 1935, 1939; Vorhies, 1935; Hardy, 1941; Tucker, 1957; Nicholson, 1950;

Ashcraft, 1932; Parker, 1952; Handley, 1959; Constantine, 1961; Grinnell, 1910; Allen, 1891). See Figure 1. Most reports have been from California (Mariposa, Kern, Los Angeles, Riverside, San Bernadino Counties, Yosemite Valley), New Mexico (San Juan, Rio Arriba, Catron, Dona Ana Counties--see Figure 2), and Utah (Salt Lake, Garfield, Kane and San Juan Counties).

The former distribution is thought to be the same as the present distribution (IUCN, 1969).

The best known locality where spotted bats have been netted is in Catron County, New Mexico. The site is a stock pond which has been built in a clearing. This clearing is surrounded by a pure stand of ponderosa pine (Pinus ponderosa). The area is on the flat top of a mountain above the Willow Creek Ranger Station in the Gila National Forest (Barbour and Davis, 1969a).

3. Status and Population Trend

The spotted bat is considered a rare species. There are no known population estimates. It is very probable that this bat never has been very common. Out of all of the thousands of bats netted in the Southwest, only thirty to forty specimens of the spotted bat had been collected up to 1969, and these collections have been largely incidental. The population trend is probably static (IUCN, 1969; Barbour and Davis, 1969a; Findley, 1972a).

4. Life History

Relatively little is known about the life history of the spotted bat. Limited observations of food habits indicate that moths which average around one-half inch in size are the primary food item. Easterla (1965) has speculated that these moths are of the family Noctuidae. Some stomachs and scats which have been examined contained nothing but the remains of moths. The bats apparently pull the heads and wings off of the moths before consumption (Ross, 1961; Easterla, 1965; Barbour and Davis, 1969a). In captivity, spotted bats have consumed moths, katydids, grasshoppers (Easterla, 1970), flies (Durrant, 1935), mealworms and cottage cheese (Barbour and Davis, 1969a; Parker, 1952). Easterla (1972) has a paper in press on the food habits of fifteen Euderma in which the main food was moths (97.1%), followed by June beetles (2.7%) and unidentified insects (.2%).

Euderma maculatum is a late flyer; most specimens have been netted after midnight and before dawn. These bats do not readily chew nets and tend to be rather docile when handled, although there are exceptions (Barbour and Davis, 1969a; Easterla, 1965).



Fig.1 Distribution of the Spotted Bat in the United States.

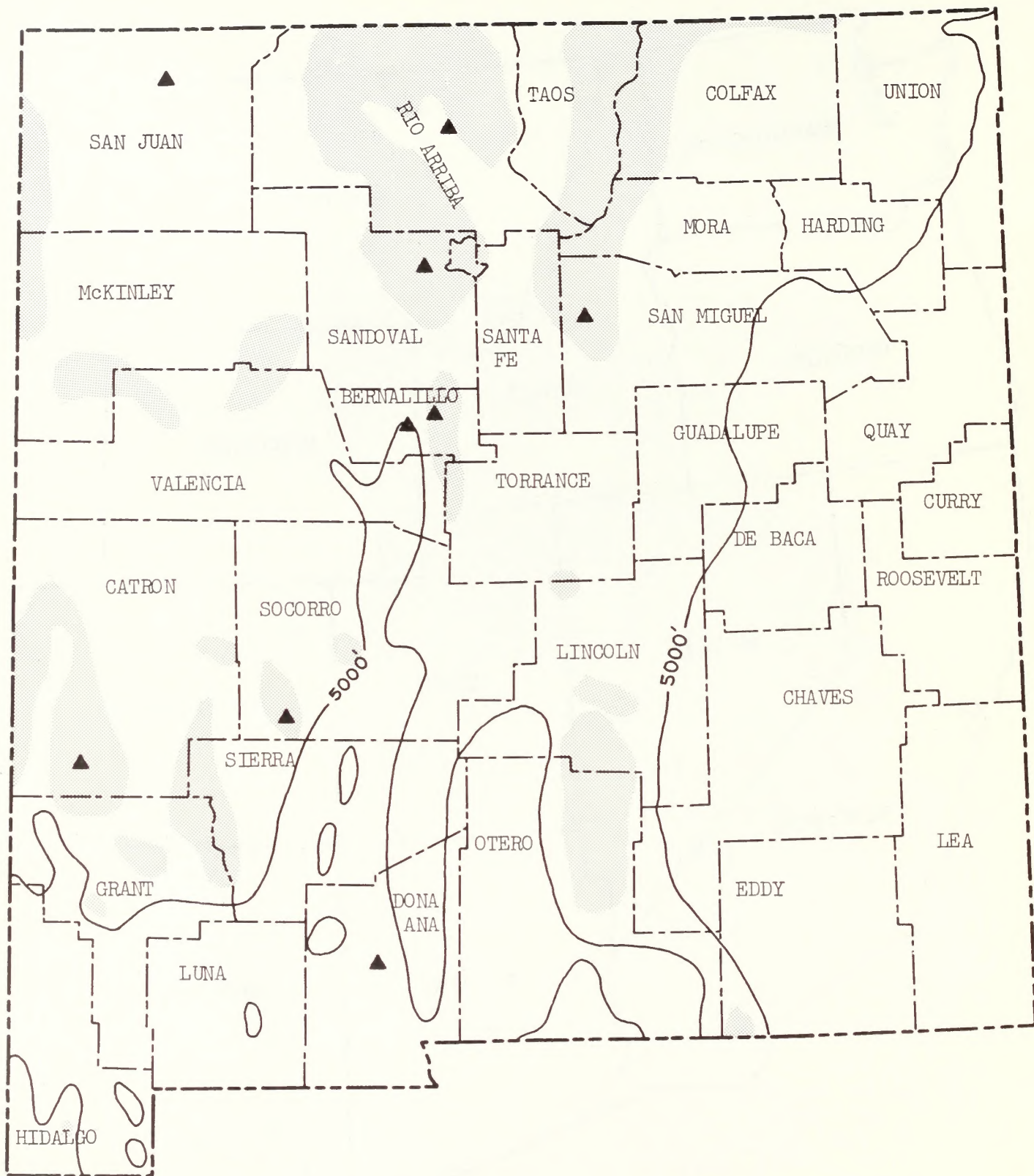


Fig. 2 ▲ indicates spotted bat records in New Mexico known to J. S. Finley as of 10/2/72. Stippled areas represent ponderosa forest or higher.

Euderma maculatum (spotted bat), Plecotis phyllotis (Allen's big-eared bat), Tadarida macrotis (big freetail bat) and Eumops perotis (western mastiff bat) give similar loud, piercing calls in flight. The voice of the spotted bat has been described as a soft, extremely high-pitched metallic squeak; a hissing noise and a ratlike squeak; and a typical bat chirp. It also clicks its teeth together and makes a grinding noise by gnashing its teeth (Handley, 1959). The calls can be heard as far away as five-eighths of a mile and are given rather frequently (Easterla, 1970). Some of the bat's vocalizations have also been described as clicking or ticking notes which Euderma apparently makes previous to taking flight (Easterla, 1965, 1972; Easterla et al, 1969).

A number of specimens have been taken in August, September and October, indicating possible postbreeding wandering (Findley and Jones, 1965). This is the period of wandering characteristic of many bats. Most recorded specimens prior to 1959 have been solitary wanderers (Handley, 1959).

Spotted bats can easily traverse flat surfaces by crawling with their wrists and feet (Easterla, 1970; Parker, 1952). This bat apparently rests suspended by its feet with its head down (Handley, 1959; Durrant, 1935). Bats in captivity readily drink water, although they may have to be force fed to get them to eat (Durrant, 1935; Easterla, 1970; Ashcraft, 1932). They are possibly rapid flyers. A number of them taken from mist nets have been injured, suggesting a high rate of speed when they collided into the nets (Easterla, 1965).

Observations to date suggest that to net a spotted bat, one should stretch a net across a waterhole in one of the southwestern states. This net should be over the only water source for miles (Barbour and Davis, 1969a).

5. Reproduction

Almost nothing is known about reproduction in the spotted bat. Lactating females have been captured in June, July and August (Jones, 1961; Easterla, 1965, 1970; Easterla et al, 1969; Barbour and Davis, 1969a).

In southwestern Texas, Easterla (1971) netted a pregnant bat on June 11, 1969, which gave birth to a single male. This is the only recorded observation of a young bat. Four hours after birth, the young male weighed four grams, its length was 59 mm,

the tail was 20 mm long, the hind foot 11 mm, the ear 12 mm, the forearm 21 mm. The young bat seemed to nurse almost constantly for the first forty-eight hours. The female was gentle and attentive, licking her offspring's face, ears, wings and back. When they were hanging upside down, the female often shielded him with her wings. She often flew with the young bat attached to a teat, but did not seem hindered by the additional weight. Four and one-half days later it died after getting chilled when it crawled through some drinking water.

6. Habitat Requirements

There is some disagreement as to the type of habitat the spotted bat requires. Handley (1959) believed the spotted bat to be an inhabitant primarily of open or scrub country. Of twenty-two recorded occurrences which he knew about, thirteen bats were found around houses. This suggests departures from the normal habitat in response to stimuli of rather frequent occurrence. Most bats have been found in rather strange situations. Handley felt that a narrow tolerance in habitat selection could explain the lack of collections in a natural situation and the frequency of abnormal ones.

A number of bats have been taken in coniferous forest areas (Findley and Jones, 1965; Jones, 1961; Ashcraft, 1932; Barbour and Davis, 1969a), leading to speculations that at least the young are raised here, and wandering occurs during the post-breeding season into other habitat types. However, to date the only young bat known to science has been taken in the Chihuahuan Desert of southwestern Texas, an area lacking in trees (Easterla, 1971).

Easterla (1965, 1970) suggests an entirely different habitat. Several bats that he caught in Garfield County, Utah, were from an area that was treeless and rolling for several square miles around the trapping site. Sagebrush (Artemesia) and rabbitbrush (Chrysothamnus) were the predominant plant species present. Yellow pine (Pinus ponderosa) was the dominant tree in the mountainous terrain around the netting sites (1965). Findley (1972a) has commented that it is not unusual for a bat to fly several miles in search of water.

In Easterla's Texas studies (1970, 1971), netting was done in Big Bend National Park. The area of capture was a shallow, barren, hot, dry canyon with walls of angled, buckled pink and red limestone. Permanent pools were the only source of water available over many square miles. Area vegetation consisted

of creosote bush (Larrea divaricata), candelilla (Euphorbia antisiphilitica), Hechtia (Hechtia scariosa), century plant (Agave lechugilla), blind pricklypear (Opuntia rufida) and ocotillo (Fouquieria splendens).

Easterla (1972) is in the process of publishing material which established Euderma maculatum as a resident of high cliffs and canyons, roosting in the cracks and crevices during the day. Although it appears to be highly selective in its roosts, he has determined that the spotted bat ranges from the ponderosa pine belt to the Lower Sonoran Life Zone. In addition to the Texas bats, several bats which he captured in northern New Mexico were caught over a large waterhole beside a high, sandstone cliff with numerous vertical cracks, and Euderma were heard calling from this cliff. Limestone cliffs with cracks were near the waterhole where he captured spotted bats in Utah.

7. Protective Measures Instituted

a. Legal or Regulatory

The spotted bat is listed in the IUCN (International Union for the Conservation of Nature and Natural Resources) Red Data Book and USDI Resource Publication 34 as a rare species. It would also be covered in the states that protect all of their vertebrates.

b. Captive Rearing - None

c. Habitat Protection and Improvement - None

d. Reintroduction - None

8. Identification of Limiting Factors

Since little is known about the habitat requirements of the spotted bat, there can only be speculation about limiting factors. The abundance and location of sedimentary cliffs in relation to water may be a limiting factor. Selectivity of eating habits (primarily very small moths) also could possibly be a factor in limiting the distribution of the spotted bat (Easterla, 1965). Easterla (1972) also feels that the construction of dams in the Southwest, which inundate high cliffs and canyon walls, is possibly destroying spotted bat habitat.

9. Recommended Species and Habitat Management Techniques

1. Survey likely habitat to determine the presence of the spotted bat on BLM lands.
2. Most spotted bats have been captured in nets stretched over waterholes, and indications are that they will fly for several miles to find water. The establishment and maintenance of waterholes in likely bat habitat may be beneficial, not only to the spotted bat but to other species.
3. Since so little is known about the spotted bat, it is extremely difficult to determine what possible impact man's activities are having on the species. Support and cooperation in any studies being conducted on the spotted bat by various individuals and agencies should be helpful in obtaining needed information.

10. Ongoing Research Projects

David A. Easterla is conducting life history studies on the spotted bat in Big Bend National Park, Texas.

11. Authorities

1. Dr. David A. Easterla
Department of Biology
Northwest Missouri State University
Maryville, Missouri 64468
2. Dr. James S. Findley
Department of Biology
University of New Mexico
Albuquerque, New Mexico 87106

12. Governmental, Private and International Organizations Actively Involved With This Species' Welfare

- A. 1. Bureau of Land Management, Denver Service Center
Denver Federal Center, Building 50
Denver, Colorado 80225
2. The BLM is responsible for the administration of the public domain lands. These lands and resources are managed under multiple-use principles, including outdoor recreation, fish and wildlife production, livestock grazing, timber, industrial development, watershed protection and mineral production, including that on the Outer Continental Shelf.

3. Max Bridge, Coordinator, Rare and Endangered Species Program, Denver Service Center.
4. The Denver Service Center is funding a contract with the Conservation Library to conduct a literature survey and evaluation on selected rare and endangered species, including the spotted bat. This Technical Note series is to provide basic information on rare and endangered species which can be used in land-use planning.

13. Listing of Photographic Material Available for Duplication

The Denver Service Center has several color slides of the spotted bat. The article by Easterla et al (1965) has several excellent color photographs. Easterla (1972) has indicated that he has hundreds of colored slides and dozens of color prints of Euderma maculatum.

14. Other

Williams et al (1970) have determined from analysis of karyotypes that Euderma maculatum is most closely related to Plecotus phyllotus, known as Allen's big-eared bat, the lappet-eared bat or the Mexican big-eared bat. Plecotus phyllotus is somewhat smaller than Euderma maculatum and its coloration ranges from light tan to nearly black. When close inspection is made, it is impossible to confuse these two species. However, there are certain similarities which should be noted.

Allen's big-eared bat has been found in pine-oak forested canyons and the coniferous forests of the mountains in the Southwest from about 5,000 to 8,500 feet. Most spotted bats have been collected between 6,000 to 8,000 feet.

Both species fly late at night, and it is only since fine-mesh mist nets have been in use that very many specimens of either species have been trapped. They also make similar sounds. When at rest, the ears lie along the back and may coil into a ram's horn appearance. When the bat becomes alert and is ready to fly, the ears are erected. These are characteristic traits for both species.

Plecotus phyllotus appears to be more abundant than Euderma maculatum, but information on it is also relatively scarce. Apparently, Allen's big-eared bat is colonial and has its day

roosts in caves or abandoned mines. Thirty bats were observed in one cave, and up to ninety-seven have been observed in a cluster. This bat seems to form maternity colonies consisting of a dozen or more females in rock shelters and mines (Barbour et al, 1969b).

One of the major areas of capture for Allen's big-eared bat is the same stock tank in Catron County, New Mexico, where a number of spotted bats have been captured. When it is possible to clearly observe these bats, there should be no difficulty with species recognition. However, in darkness, misidentification may occur if the observer is inexperienced with the calls and flight behavior of these two species (Barbour and Davis, 1969b; Easterla, 1972).

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